

**The Identity of *Centrolenella grandisonae*
Cochran and Goin (Anura: Centrolenidae)**

WILLIAM E. DUELLMAN

Museum of Natural History and Department of Systematics and Ecology,
The University of Kansas, Lawrence, Kansas 66045

ABSTRACT

The name *Centrolenella grandisonae* was misapplied by Lynch and Duellman (1973); the name is now associated with a red-spotted species on the Pacific versant of Colombia and Ecuador. A new name, *Centrolenella lynchi*, is proposed for the species that was erroneously called *Centrolenella grandisonae*.

The richness of the centrolenid frog fauna on the Pacific slopes of Colombia and Ecuador is only now being appreciated. Lynch and Duellman (1973) recorded five species from the cloud forests on the Pacific slopes of Ecuador, but fieldwork in 1974–1979 has more than doubled that number and has resulted in the discovery of additional species in Colombia.

Lynch and Duellman (1973) associated five specimens of a spotted *Centrolenella* from Tandapi, Ecuador, and two from Santa Leticia, Colombia, with *Centrolenella grandisonae*, a species described by Cochran and Goin (1970) on the basis of a single specimen from Pueblo Rico, Colombia. Lynch and Duellman (1973) noted that the holotype of *C. grandisonae* differed from the specimens that they assigned to that species by being slightly larger and by having prevomerine teeth.

During the past five years numerous specimens of a distinctive red-spotted *Centrolenella* have been collected in Ecuador and Colombia. Study of these specimens reveals that they are representatives of the species named *C. grandisonae* by Cochran and Goin. In the following redescription of the species, the sequence in the numbered diagnosis and the terminology follow Lynch and Duellman (1973).

Centrolenella grandisonae Cochran and Goin

Centrolenella grandisonae Cochran and Goin, 1970:513 [Holotype. BMNH 1910.7.11.68 from Pueblo Rico, Departamento de Caldas, Colombia].

Diagnosis. 1) prevomerine teeth 0–4; 2) bones pale green; 3) parietal peritoneum white; visceral peritoneum clear; 4) color in life green with small

red spots; in preservative, lavender with white spots; 5) webbing between outer fingers III $2\frac{1}{4}$ —2 IV; 6) webbing on foot I $1\frac{1}{2}$ —2 II $1\frac{1}{2}$ —2 III $1\frac{1}{2}$ — $2\frac{1}{4}$ IV $2\frac{1}{4}$ — $1\frac{1}{2}$ V; 7) snout round in dorsal view, rounded dorsally and abruptly inclined in profile; 8) dorsal skin pustular; 9) arms and legs lacking dermal folds; 10) humeral spine present in males; 11) lower two-thirds of tympanum visible, directed posterolaterally with dorsal inclination.

The presence of red spots on a granular dorsum immediately distinguishes *C. grandisonae* from other known species of *Centrolenella*. In skin texture, *C. grandisonae* is most like *C. megacheira*, which has black spots on the dorsum and lacks humeral spines in the males. Other *Centrolenella* that have white spots on a lavender dorsum in preservative differ from *C. grandisonae* by having smooth or shagreened skin on the dorsum.

Description. Adults moderately large; snout-vent length 25.1–29.3 mm ($\bar{x} = 27.2$, $n = 44$) in males, 28.9–30.7 mm ($\bar{x} = 29.8$, $n = 4$) in females; head wider than body; width of head 32.6–36.8 percent ($\bar{x} = 34.3$, $n = 48$) of snout-vent length. Snout short, high, round in dorsal view, in profile rounded anterior to nostrils and abruptly sloping ventrally to margin of lip; canthus round; loreal region shallowly concave; lips rounded; nostrils about five-eighths distance from eye to tip of snout, barely protuberant laterally; internarial area barely depressed. Eye large, protuberant, directed anterolaterally. Upper one-third of tympanum covered by pustular supratympanic fold; tympanic annulus distinct ventrally; tympanum directed posterolaterally with moderate dorsal inclination. Prevomerine teeth 0–0–3–4 (total teeth 0–7, $\bar{x} = 2.63$, $n = 44$, in males; 0–6, $\bar{x} = 4.5$, $n = 4$, in females); dentigerous processes of prevomers transversely elliptical and broadly separated medially, between small ovoid choanae; tongue broadly separated medially, between small ovoid choanae; tongue broadly cordiform, shallowly notched posteriorly, barely free behind; vocal slits extending from mid-lateral base of tongue to angles of jaws; vocal sac single, median, subgular.

Humeral spine long, pointed, essentially parallel to axis of humerus, tip enclosed by skin of upper arm; forearm moderately robust; ulnar fold and tubercles absent; first finger slightly shorter than second; fourth finger much longer than second; lateral fringes on fingers; webbing absent between first and second fingers; webbing formula for other fingers II ($2-2\frac{1}{2}$)—($3\frac{1}{4}-3\frac{1}{2}$) III ($2-2\frac{1}{2}$)—($2-2\frac{1}{4}$) IV; webbing emarginate; discs broad, rounded; subarticular tubercles small, round, simple; supernumerary tubercles absent; palmar tubercle low, bifid; nuptial excrescences absent. Hind limbs slender; length of tibia 54.0–62.3 percent ($\bar{x} = 57.6$, $n = 48$) of snout-vent length; tarsal folds and tubercles absent; inner metatarsal tubercle ovoid, flat; outer metatarsal tubercle small, round; subarticular tubercles small, round; supernumerary tubercles absent; toes about three-fourths webbed; webbing formula I ($1-1\frac{3}{4}$)—($2-2\frac{1}{4}$) II ($1-1\frac{1}{2}$)—($2-2\frac{1}{2}$) III ($1-1\frac{1}{2}$)—($2-2\frac{1}{4}$) IV ($2-2\frac{1}{4}$)—($1-1\frac{1}{2}$) V; discs round, slightly smaller than those on fingers.



Fig. 1. *Centrolenella grandisonae*, KU 164670, ♀, 30.7 mm snout-vent length.

Skin on dorsum finely pustular; skin on belly and proximal posteroventral surfaces of thighs coarsely granular; skin on other surfaces smooth. Anal opening directed posteriorly below broad dermal flap at upper level of thighs; numerous small round tubercles below anal opening; pair of large, flat tubercles on proximal ventral surfaces of thighs.

Color in preservative: dorsal surfaces of head, body, forearm, thigh, shank, and tarsus lavender; upper lip, upper arm, hands, feet, flanks, and venter cream. Small round pink to white spots on head (including eyelids), dorsum of body, and usually on shanks (3–21 spots on head and body, $\bar{x} = 9.6$, $n = 48$; 0–4 spots on each shank, $\bar{x} = 1.53$, $n = 96$).

Color in life: dorsum green with small bright red spots; parietal peritoneum creamy white; visceral peritoneum clear; heart not visible; vocal sac and bones green iris silvery white with black flecks (Fig. 1).

Distribution. *Centrolenella grandisonae* is widely distributed in cloud forest on the Pacific slopes of the Cordillera Occidental from Departamento de Calda, Colombia, to Provincia de Pichincha, Ecuador. It has a known elevational distribution from 1140 to 1850 m.

Specimens examined: COLOMBIA: *Caldas*: Pueblo Rico, 1540 m, BMNH 1910.7.11.68. *Valle*: Río Calima, 1.5 km W Lago Calima, 1230 m, KU 169670–74. ECUADOR: *Carchi*: Maldonado, 1410 m, KU 178168–69. *Pichincha*: 4 km NE Dos Ríos, 1140 m, AMNH 95477, KU 164670–85; 25.7 km ENE La Palma (Chiriboga Road), 1820 m, MCZ 93587; 3.5 km NE

Mindo, 1540 m, AMNH 95474–76, KU 164686–90; 2 km E Tandapi, 1550 m, MCZ 93023–26, 97848–51, USNM 211211; 1 km SW Tandayapa, 1640 m, MCZ 97847, USNM 211214; 2.9 km SW Tandayapa (Mindo Road), 1820 m, USNM 211212–13; 5.1 km SE Tandayapa (Nono Road), 1850 m, USNM 211215.

Remarks. Most males were calling from the upper sides of leaves (up to 3 m) above streams varying from narrow trickles to 2 m wide. The call is a single, loud, piercing “peep.”

The proper allocation of the name *Centrolenella grandisonae* leaves the taxon to which that name was applied by Lynch and Duellman (1973) without a specific name.

Centrolenella lynchi new species

Holotype. KU 164691, an adult male, from a stream 4 km northeast (by road) of Dos Ríos, Provincia de Pichincha, Ecuador, 1140 m (00°21'S, 78°54'W), one of a series collected on 2 April 1975 by William E. Duellman and Alan H. Savitzky.

Paratopotypes. KU 164692–99, collected with the holotype; KU 164700 obtained on 7 May 1975 by William E. Duellman.

Diagnosis. 1) prevomerine teeth absent; 2) bones pale green; 3) parietal peritoneum white; visceral peritoneum clear; 4) color in life green with minute yellowish white flecks and small black spots; in preservative, lavender with small dark spots and white flecks; 5) webbing between outer fingers III 2—2 IV; 6) webbing on foot I 1—2 II 1—2 III 1—2 IV 2—1 V; 7) snout truncate in dorsal view, round in profile; 8) dorsal skin shagreened with fine spicules; 9) low ulnar fold on forearm; 10) humeral spine present in males.

Two other Ecuadorian species are lavender in preservative with dark spots and white flecks on the dorsum. Of these, *C. pipilata* differs from *C. lynchi* by having tarsal folds and incised webbing; *C. peristicta* is nearly identical to *C. lynchi* in coloration but has more webbing on the hand—III 2—1½ IV. Both species are smaller than *C. lynchi*; males of *C. pipilata* have snout-vent lengths of 19.5–22.9 mm (\bar{x} = 21.5, n = 10) and those of *C. peristicta* are 18.7–20.6 mm (\bar{x} = 19.7, n = 2).

Description. Adults moderate in size; snout-vent length 23.5–26.4 mm (\bar{x} = 24.7, n = 9) in males, 24.9 mm in single female; head as wide as body, much wider than long; width of head 33.6–36.7 percent (\bar{x} = 34.9, n = 10) of snout-vent length. Snout short, high truncate in dorsal view, round in profile; canthus round; loreal region barely concave; lips round; nostrils about two-thirds distance from eye to tip of snout, slightly protuberant anterolaterally; internarial area noticeably depressed. Eye moderately large, protuberant, directed anterolaterally. Upper one-third of tympanum covered by supratympanic fold; tympanic annulus distinct ventrally; tympanum directed posterolaterally with posterodorsal inclination. Prevomerine dentig-



Fig. 2. *Centrolenella lynchi*, KU 164691, ♂, 25.3 mm snout-vent length.

erous processes and teeth absent; choanae longitudinally ovoid; tongue broadly cordiform, shallowly notched behind, free posteriorly for about one-third of its length; vocal slits extending from midlateral base of tongue to angles of jaws; vocal sac single, median, subgular.

Humeral spine, short, pointed, at right angle to humerus, tip enclosed by skin of upper arm; forearm robust, bearing low ulnar fold; first finger slightly shorter than second; fourth finger much longer than second; lateral fringes on fingers; webbing absent between first and second fingers; webbing formula for other fingers II 2—3 III (2—2½)—2 IV; webbing emarginate; discs broad, rounded; subarticular tubercles moderately large, round, simple; supernumerary tubercles absent; palmar tubercle low, ovoid, simple; nuptial excrescences absent. Hind limbs moderately slender; length of tibia 57.1—62.1 percent (\bar{x} = 59.8, n = 10) of snout-vent length; tarsal folds and tubercles absent; inner metatarsal tubercle rounded, ovoid; outer metatarsal tubercle small, conical; subarticular tubercles small, round; supernumerary tubercles minute, present on proximal segments; toes about webbed; webbing formula I 1—2 II 1—2 III 1—2 IV 2—1 V; discs round, slightly smaller than those on fingers.

Skin on dorsum shagreened with scattered minute spicules, especially prominent in temporal region and along posterior margin of jaw; skin on belly and proximal posteroventral surfaces of thighs coarsely granular; skin on other surfaces smooth. Anal opening directed posteriorly below short

anal sheath at upper level of thighs; numerous small, round tubercles below anus; pair of large, flat tubercles on proximal ventral surfaces of thighs.

Color in preservative: dorsal surfaces of head, body, and limbs, exclusive of digits, lavender with many minute white flecks and more numerous, larger dark lavender spots; flanks, venter, and hidden surfaces of limbs cream.

Color in life: dorsum dull green with minute yellowish white and black flecks; tips of digits yellow; parietal peritoneum creamy white; visceral peritoneum clear; heart not visible; bones green; iris bronze with black reticulations (Fig. 2).

Variation. Fourteen males and one female from Tandapi, 1460 m, Provincia de Pichincha, Ecuador, are like the type series in coloration, but the spicules in the skin are less conspicuous. Also there is slightly less webbing on the hand in some individuals; in six males the webbing formula is II 2—3½ III 2—2 IV, and in one it is II 2—3½ III 2½—2 IV, whereas in the others the webbing is the same as that in the type series.

The 14 males from Tandapi have snout-vent lengths of 23.3–26.0 mm (\bar{x} = 24.8) and the one female, 24.8 mm. The samples from Tandapi and from the type locality are significantly different ($P < 0.01$; student- t) in the ratios of head width, tibia length, and foot length to snout-vent length (SVL); in each case the ratios are smaller in the sample from Tandapi, indicating that frogs from there have proportionately longer bodies than do those at the type locality. In the following list of data, the topotypes ($n = 9$) are followed by the data for the sample from Tandapi ($n = 14$); the range is followed in parentheses by the mean and one standard deviation: head width/SVL .336–.367 (.350 \pm .010), .314–.349 (.334 \pm .009); tibia length/SVL .571–.621 (.599 \pm .018), .549–.609 (.571 \pm .016); foot length/SVL .521–.563 (.540 \pm .015), .481–.514 (.499 \pm .010).

Distribution. This species is known from elevations of 1140–1500 m on the Pacific slopes of the Cordillera Occidental in Ecuador, where it inhabits cloud forest.

Specimens examined: ECUADOR: *Pichincha*: 4 km NE Dos Ríos, 1140 m, KU 164691–700; 14.4 km ENE La Palma (Chiriboga Road), 1380 m, MCZ 91455; Tandapi, 1460 m, KU 118036, 118047–50, 178095–105; 2.1 km E Tandapi, 1500 m, MCZ 93313–14, 95742.

Remarks. Males were calling from the upper sides of leaves of trees and bushes overhanging streams; at the type locality, they were 2.5–4 m above the water. At that stream, *Centrolenella prosoblepon* and *C. valerioi* also were calling, and *C. grandisonae* was calling from vegetation along a small tributary.

Lynch and Duellman (1973) referred two specimens (KU 144129–30) from Santa Leticia, 2000 m, Departamento de Cauca, Colombia, to *C. grandisonae* (= *C. lynchi*). I am not convinced that those specimens are *C. lynchi* and at present do not assign them to any known species.

Etymology. I take pleasure in associating this frog with John D. Lynch, who collected the first specimens in 1968 and joined me in perpetrating the error of assignment of *C. grandisonae* in 1973.

ACKNOWLEDGMENTS

I am grateful to my field companions—Alan H. Savitzky, John E. Simons, and Linda Trueb—for aid in collecting specimens, and to John D. Lynch, Kenneth Miyata, and Roy W. McDiarmid for making available specimens collected by them. Field work in South America was supported by grants from the National Science Foundation (DEB 74-01998) and the National Geographic Society (1304). For permission to study specimens in their care, I am indebted to Alice G. C. Grandison, British Museum (Natural History) (BMNH); W. Ronald Heyer, National Museum of Natural History (USNM); Charles W. Myers, American Museum of Natural History (AMNH), and Ernest E. Williams, Museum of Comparative Zoology, Harvard University (MCZ). The Museum of Natural History at The University of Kansas is abbreviated KU.

LITERATURE CITED

- Cochran, D. M., and C. J. Goin. 1970. Frogs of Colombia. Bull. U.S. Natl. Mus. 288:1-655.
Lynch, J. D., and W. E. Duellman. 1973. A review of the centrolenid frogs of Ecuador, with descriptions of new species. Occas. Pap. Mus. Nat. Hist. Univ. Kansas 16:1-66.